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"AN APPROACH TO MONITOR COVID 19 SOP"

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Abstract— **The novel coronavirus also called Covid-19 had a huge effect on different sectors in many territories and imposed governments across the world to urge lockdowns to avert novel coronavirus transmission. To prevent the spreading of virus people are instructed to follow standard operating protocol (SOP). This little step of wearing a face mask, following social distancing would save plenty of lives as the spread of the novel coronavirus could be mitigated. This theme consists of social distancing noticing and face mask detection for the events of disease like novel coronavirus can be solved by maintaining social distancing as well as wearing/putting on its face mask. This approach is used to develop a Mask Detection using OpenCV, Keras/TensorFlow and Deep Learning.**

Keywords— **Open CV, Keras/Tensor Flow and Deep Learning**

I. INTRODUCTION

Since the end of 2019, infectious corona virus disease (COVID-19) has been reported for the first time in Wuhan, and it has become a public damage fitness issue in China and even worldwide. This pandemic has devastating effects on societies and economies around the world causing a global health crisis. It is an emerging respiratory infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus 2(SARS-CoV-2). All over the world, especially in the third wave, COVID-19 has been a significant healthcare challenge. To prevent rapid COVID-19 infection, many solutions, such as confinement and lockdowns, are suggested by the majority of the world's governments. In particular, some researchers have focused on the hesitancy of governments in enacting difficult but necessary virus containment measures (e.g., stay-at-home orders and lockdowns), as well as non-cooperation for reasons other than free riding. For instance, authors in argued that because strict stay-at-home measures can greatly impact people's livelihoods, the cost of staying home (coupled with lockdown fatigue) can end up outweighing the risk of infection from going out. At this moment, WHO (World Health Organization) recommended that people around the world should wear masks to prevent the risk of novel coronavirus transmission and also should maintained social distance of at least 3m between two people to prevent the spread of virus. Public service will be provided only if they are wearing mask and maintaining safe social distancing. This model describes the approach to prevent the increase of coronavirus by monitoring in real-time if any person is maintaining social distance and wearing face masks in public places.

II. PROPOSED ALGORITHM

A. Concept of face detection

There are two types of face detection:
1) Face detection in images and
2) Real-time face detection

➢ Face detection in images

Most face detection systems attempt to extract a fraction of the whole face, thereby eliminating most of the background and other areas of an individual's head such as hair that are not necessary for the face recognition task. With static images, this is often done by running a across the image. A neural network or some other classifier is trained using supervised learning with 'face' and 'nonface' examples, thereby enabling it to classify an image (window in face detection system) as a 'face' or 'non-face' as shown in Fig 1.

➢ Real-time face detection

Real-time face detection involves detection of a face from a series of frames from a video capturing device. While the hardware requirements for such a system are far more stringent, from a computer vision standpoint, real-time face detection is actually a far simpler process than detecting a face in a static image. This is because unlike most of the surrounding environment, people are continually moving. Since in real-time face detection, the system is presented with a series of frames in which to detect a face, by using spatio-temporal filtering (finding the difference between subsequent frames), the area of the frame that has changed can be identified and the individual detected.

B. Face recognition

Many of the techniques proposed during the early stages of computer vision cannot be considered successful, but almost all of the recent approaches to the face recognition problem have been creditable. All approaches to human face recognition can be divided into two strategies:
1) Geometrical features
2) Template matching

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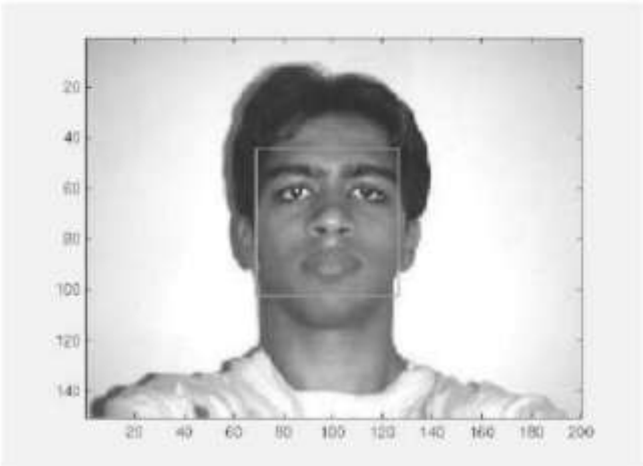

Fig. 1. A successful face detection in an image with a frontal view of a human face.

1. Face recognition using geometrical features

This technique involves computation of a set of geometrical features such as nose width and length, mouth position and chi n shape, etc. from the picture of the face that want to recognize. This set of features is then matched with the features of known individuals. A suitable metric such as Euclidean distance (finding the closest vector) can be used to find the closest match. Most pioneering work in face recognition was done using geometric.

2. Face recognition using template matching

This is similar the template matching technique used in face detection, except here an image is not classified as a 'face' or 'non-face' but are trying to recognize a face Whole face, eyes, nose and mouth regions which could be used in a template matching strategy as shown in Fig.2. The basis of the template matching strategy is to extract whole facial regions (matrix of pixels) and compare these with the stored images of known individuals. Once again Euclidean distance can be used to find the closest match. The simple technique of comparing grey-scale intensity values for face recognition was used. However there are far more sophisticated methods of template matching for face recognition. These involve extensive pre-processing and transformation of the extracted grey-level intensity values.

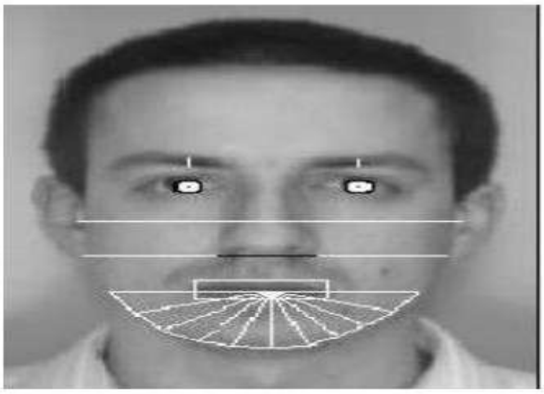

Fig. 2. Geometrical features

C. **Image processing using machine learning**

i. Convolution neural network

Convolutional neural network (CNN), a class of artificial neural networks that has become dominant in various computer vision tasks, is attracting interest across a variety of domains, including radiology. CNN is designed to automatically and adaptively learn spatial hierarchies of features through backpropagation by using multiple building blocks, such as convolution layers, pooling layers, and fully connected layers.

ii. Deep Neural Network Deep neural networks (DNNs) are improved versions of the conventional ANN with multiple layers. The DNN models are recently becoming very popular due to their excellent performance to learn not only the nonlinear input–output mapping but also the underlying structure of the input data vectors. A DNN is an artificial neural network that consists of more than three layers; it inherently fuses the process of feature extraction with classification into learning using Fuzzy Support Vector Machine(FSVM) and enables the decision making.

OpenCV

OpenCV (Open Source Computer Vision Library) is a library of programming functions mainly aimed at real-time computer vision.

Keras

Keras is an open-source neural-network library written in Python. It is capable of running on top of TensorFlow, Microsoft Cognitive Toolkit. Designed to enable fast experimentation with deep neural networks, it focuses on being user-friendly, modular, and extensible. Keras contains numerous implementations of commonly used neural network building blocks such as layers, objectives, activation functions, optimizers, and a host of tools to make working with image and text data easier.

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III. DATA FLOW DIAGRAM

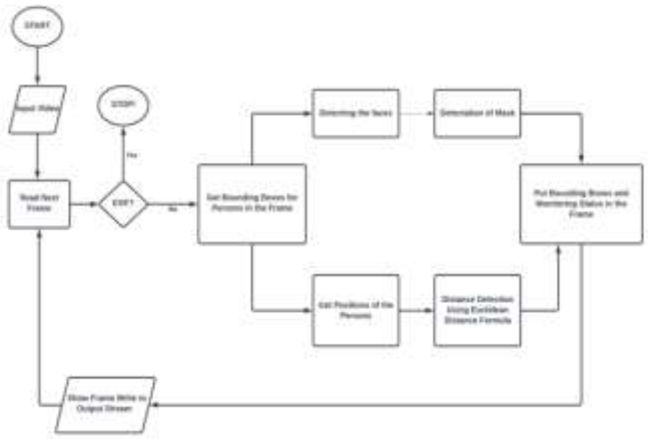

Fig. 3. Data Flow Diagram

In the proposed system architecture, system takes the input video and read the video by dividing it into number of frames if it reaches EOF(End of Frame) then the system will stop. Else detected person in each frame get a bounding boxes around them. Then using different algorithm, mask detection and social distancing can to computed. If the person in the frame is wearing the mask and maintaining distance the bounding box will be displayed in green colour or if the person is not maintaining social distance and not wore face mask then bounding box will be red colour with monitoring status. Atlast create an output stream and then show the results. It is done for every frame till it reaches EOF.
System architecture consists of two phases. The first phase is about training the model which is loaded dataset from the disk and train the model using TensorFlow and Keras on it before the model is saved. The second phase involves loading the detector performing face detection, and detecting the social distancing features in images or video streams. A face detector model is required to recognise faces and detect masks accurately. The Convolutional Neural Networks(CNN) has been utilized, an algorithm used for detecting objects that is used here to recognize faces in real time videos. OpenCV library classifier such as haarcascade_frontalface_default – used for detection of human face from frontal side. For detecting the social distancing between two individuals in gathering, a pretrained mobileNetV2 Caffe model has been used the is trained on the image net dataset of several classes. Each detected person is indicated by a box drawn around it, and data is subsequently used for distance measurement between people.

The main steps involved are,
Step-1. Capture the video. Read the video by dividing it into a number of frames.
Step-2. Else, detect persons in each frame and get the bounding boxes around them with the help of OpenCV. a. If it reaches to EOF, stop.
Step-3. Further, get the positions of the people to detect where the clusters are forming.
Step-4. While detecting persons, detect their faces to detect whether they have masks on or not.
Step5. With the help of bounding boxes on the person and their faces, measure the distance between them and detect masks on them.
Step-6. Create an output stream and then show the results.
Step-7. Do this for every frame till it reaches to end of file.

IV. EXPERIMENT AND RESULT

Fig. 4. Social distance detection

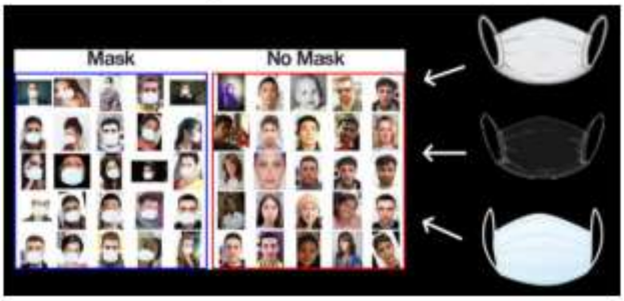

Fig. 5. Face mask detection

V. CONCLUSION

The social distancing can reduce the spread of the coronavirus; face coverings help prevent the infectious disease to transmit via the air. Therefore, to support this study, AI-based CNN real-time approach towards the detection of social distancing and face mask. The system uses mobileNetV2 with SSD framework for human detection as it improves predictive accuracy, particularly for small scale objects. After detection, the system displays alert signal.

VI. REFERENCE

[1] Bhavik Limbasiy, Chinmay Raut (May 2021), "COVID-19 Face Mask and Social Distancing Detector using Machine Learning", International Research Journal of Engineering and Technology, Volume: 08 Issue: 05

[2] S. Ge, J. Li, Q. Ye and Z. Luo, "Detection of Masked Faces in the Wild with LLE-CNNs," 2017 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Honolulu, HI, 2017, pp. 426-434.

[3] Glass RJ, Glass LM, Beyeler WE, Min HJ. Targeted social distancing architecture for pandemic influenz

[4] X. Zhu and D. Ramanan. "Face detection, pose estimation, and landmark position in the wild". In IEEE CVPR, 2012, pages 2879–2886.

[5] P. Viola and M. Jones, "Fast object detection using an enhanced cascade of simple features," Proceedings of the 2001 IEEE Computer Society Conference on Computer Vision and Pattern Recognition. CVPR 2001, Kauai, HI, USA, 2001, pp. I-I.

[6] Nenad Petrović and Đorđe Kocić(2020), "IoT-based system for COVID-19 Indoor Safety Monitoring", IcETRAN.

[7] Sushama Ghodke1, Akshay Rajurkar1, Harshal Wandrekar1, Ritesh Agwan1, Dr.Srinivas Ambala(April 2021), "Social Distancing and Mask Detection By Using Deep Learning".

[8] S. Meivel, K. Indira Devi, S. Uma Maheswari, J. Vijaya Menaka(December 2020), "Real time data analysis of face mask detection and social distance measurement using Matlab".

[9] Sahana Srinivasan, Rujula Singh R , Ruchita R Biradar, Revathi SA(2021) , "COVID-19 Monitoring System using Social Distancing and Face Mask Detection on Surveillance video datasets",.

[10] Krisha Bhambani, Tanmay Jain, Dr. Kavita A. Sultanpure, "Real-time Face Mask and Social Distancing Violation Detection System using YOLO".

[11] Muhammad Haris Kaka Khel, Kushsairy Kadir, Waleed Albattah, Sheroz Khan, MNMM Noor, Haidawati Nasir, Shabana Habib, Muhammad Islam, Akbar Khan(Nov 2021), "Real-Time Monitoring of COVID-19 SOP in Public Gathering Using Deep Learning Technique".

[12] Arjya Das, Mohammad Wasif Ansari, Rohini Basak(2020), "Covid-19 Face Mask Detection Using TensorFlow, Keras and OpenCV".

[13] Zhenfeng Shao, Gui Cheng, Jiayi Ma, Zhongyuan Wang, Jiaming Wang, Deren Li, "Real-time and Accurate UAV Pedestrian Detection for Social Distancing Monitoring in COVID-19 Pandemic".

[14] Ersin Elbasi, Ahmet E. Topcu and Shinu Mathew(July 2021), "Prediction of COVID-19 Risks in Public Areas Using IoT and Machine Learning",14.

[15] IEEE Transactions on Industrial Informatics,"A Vision-based Social Distancing and Critical Density Detection System for COVID-19"

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